

Commonwealth of Virginia  
Department of Environmental Quality  
Division of Waste Operations Guidance Document No. 03-1999

**SUBJECT: MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**

**DATE:** October 06, 1999

**I. INTRODUCTION**

This guidance document is intended to clarify the permitting requirements for modifying the Solid Waste Facility Boundary for facilities that have an active Solid Waste Management Facility Permit issued by DEQ. This policy establishes the applicable Sections of 9 VAC 20-80-500 for the limited purpose of establishing a gas monitoring network outside the current Facility Boundary contained in the permit. This policy is applicable to a landfill capacity expansion. This policy uses terms which are defined in Section III, "Definitions."

The applicant should be aware that this amendment request does not provide relief from compliance with 9 VAC 20-80-280. The existing compliance boundary remains in effect until permit is amended that contains the amended Part A and Part B information. After the Department has reviewed all Part A and Part B information and the information is technically adequate, the Department will hold a hearing and process the application in accordance with 9 VAC 20-80-500.E. If the facility is experiencing gas migration at the facility property boundary, then the facility should do everything possible to protect human health and the environment during the processing of the application. If the facility is implementing a remediation plan in timely manner then enforcement actions may not be initiated. Formal enforcement may not be initiated if the facility is aggressively implementing their gas remediation plan. Submission of the application does not relieve the owner from the responsibility to take immediate action when a gas migration problem is an imminent safety danger to public health and the environment.

**II. BACKGROUND**

The Virginia Solid Waste Management Regulations require all sanitary landfills and some CDD/Industrial Landfills to have gas monitoring probes [9 VAC 20-80-280].

- A. The gas monitoring network shall be designed to ensure detection of the presence of decomposition gas migrating beyond the landfill property boundary and into facility structures.
- B. The monitoring network shall be designed to account for the following specific site characteristics, and potential migration pathways or barriers, including, but not limited to:

**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 2

1. Local soil and rock conditions;
2. Hydrogeological and hydraulic conditions surrounding the facility;
3. Locations of buildings and structures relative to the waste disposal area,
4. Adjacent land use, and inhabitable structures within 1000 feet of the landfill property boundary;
5. Man-made pathways, such as underground construction; and
6. The nature and age of waste and its potential to generate decomposition gas.

**III. DEFINITIONS**

- A. A Facility Boundary  $\equiv$  see facility property boundary.
- B. A Facility Property Boundary  $\equiv$  means the limit of property that is used in the management and disposal of solid waste, and includes all structures, appurtenances, and improvements on the land used for the management and disposal of solid waste. The facility property boundary and property boundary are not synonymous. The facility property boundary may be conterminous [in common] with the property boundary or contained wholly within the property boundary. The facility property boundary is identified on a map by survey or by grid reference. The facility property boundary is included in an approved solid waste management facility permit and has been approved under the Part A process. The new Facility Property Boundary becomes part of the facility information which must be recorded and platted in accordance with Closure requirements of the permit and 9 VAC 20-80 and cannot be subdivided or developed for other uses without amending the permit.
- C. A Gas Compliance Boundary  $\equiv$  means the limit beyond which if the methane concentrations exceed the lower explosive limit (LEL), then the facility is out of compliance with the requirements of its permit and corrective action must be taken. The gas compliance boundary is determined by the location of the gas probes within the permitted Facility Property Boundary. It is the boundary at which all measurements are taken to ensure the gas concentration levels do not exceed the LEL.
- D. A Parcel  $\equiv$  mean the unit of additional land that the landfill owner/operator is considering to incorporate into the facility property boundary to move the gas compliance boundary.

**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 3

- E. AProperty Boundary≡ means the boundary that encompasses real estate property that is under direct control of the landfill owner through legal agreements.
- F. ASolid Waste Boundary" means the outermost perimeter of the solid waste (vertical projection on a horizontal plane) as it would exist at completion of the disposal activity within the facility property boundary. Also known as limits of waste.
- G. ASolid Waste Management Facility Boundary≡ see facility property boundary.

**IV. GUIDANCE**

- A. Procedures and submission information required for an amendment to the permit for a modification of the facility property boundary.[9 VAC 20-80-500]
  - 1. Any person who proposes to modify a solid waste management facility boundary ("SWMFB") shall file a notice of intent with the Director stating the desired permit amendment, the precise location of the proposed facility, and the intended modification of the facility. The notice shall be in letter form and be accompanied by area and site location maps.
  - 2. No application shall be deemed complete unless it is accompanied by a disclosure statement as shown in APPENDIX 7.1. (VSWMR) for all key personnel.
  - 3. No application for a permit amendment for a solid waste management facility shall be considered complete unless the notice of intent is accompanied by a certification from the governing body of the county, city, or town. The certification shall indicate that the location of the amended facility and the property that it is on, is consistent with all applicable ordinances. A certification form is in APPENDIX 7.1 (VSWMR). The certification shall be with our qualifications, conditions, or reservations. The certification shall be accompanied with a permit application fee of \$3200.00.
  - 4. This application must contain a key map delineating the general location of the proposed facility. The key map shall be plotted on a seven and one-half minute United States Geological Survey topographical quadrangle. The quadrangle shall be the most recent revision available, shall include the name of the quadrangle and shall delineate a minimum of one mile from the perimeter of the proposed facility boundaries. One or more maps may be utilized where necessary to insure clarity of the information submitted. The map and drawing approved with the original Part A for the site must be amended to show the new facility property boundary.

**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 4

5. A near-vicinity map shall be prepared and attached as part of the application. The vicinity map shall have a minimum scale of one inch equals 200 feet (1" = 200'). The vicinity map shall delineate an area of 1000 feet from the perimeter of the property line of the proposed facility. The vicinity maps may be an enlargement of a United States Geological Survey topographical quadrangle or a recent aerial photograph. The vicinity map shall depict the following:
  - a. All homes, buildings or structures including the layout of the buildings which will comprise the proposed facility;
  - b. The existing [permitted] and proposed facility property boundaries of the facility;
  - c. The limits of the actual disposal operations within the boundaries of the facility;
  - d. Lots and blocks taken from the tax map for the site of the proposed facility and all contiguous properties;
  - e. The base floodplain, where it passes through the map area; or, otherwise, a note indicating the expected flood occurrence period for the area;
  - f. Existing land uses and zoning classification;
  - g. All water supply wells, springs or intakes, both public and private;
  - h. All utility lines, pipelines or land based facilities (including mines and wells); and
  - i. All parks, recreation areas, dams, historic areas, wetlands areas, monument areas, cemeteries, wildlife refuges, unique natural areas or similar features.
6. The Department will not consider an application for a permit from any person who does not demonstrate legal control over the site for a period of the permit life. A documentation of an option to purchase will be considered as a temporary substitute for a deed; however, the true deed must be provided to the Department before the permit amendment can be issued.

**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 5

7. An application will not be considered to be complete unless the application contains a signed statement by the applicant that he has sent written notice to all adjacent property owners or occupants that he intends to expand the Facility Property Boundary on site; and contains a copy of the notice and the names and addresses of those to whom the notices were sent.

**B. Buffer Requirements [9 VAC 20-80-240]**

If the facility boundary is modified to include the parcel, then the new facility boundary shall meet the buffer requirements of 9 VAC 20-80-250 A. The following requirements apply specifically to the parcel.

1. Floodplain.  
The gas monitoring probes on the parcel shall not be located in a 100-year floodplain.
2. Unstable areas.  
Since no construction activities will occur on the parcel, the provisions of VSWMR, 9 VAC 20-80-250 A 3 are not applicable. Local unstable areas should have been investigated in the approved Part A application. However, the parcel should be investigated to ensure it does not contain natural or man-made features which might affect monitoring activities.
3. Wetlands. The gas monitoring probes on the parcel shall not be located in wetlands.
  - a. The gas migration must not cause or contribute to significant degradation of wetlands. The owner or operator shall demonstrate that extending the Facility Property Boundary for the purpose of gas migration and monitoring will protect ecological resources by addressing the following factors:
    - i. Impacts on fish, wildlife, and other aquatic resources and their habitat from release of the solid waste or from contact with Landfill gas [LFG];
    - ii.. The potential effects of release of LFG to the wetland and the resulting impacts on the environment; and
    - iii. Any additional factors, as necessary, to demonstrate that ecological resources in the wetland are sufficiently protected.

**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 6

- b. To the extent required under §404 of the Clean Water Act or applicable Virginia wetlands laws, steps have been taken to attempt to achieve no net loss of wetlands (as defined by acreage and function) by first avoiding impacts to wetlands to the maximum extent practicable as required by 9 VAC 20-80-250 A 4 a, then minimizing unavoidable impacts to the maximum extent practicable, and finally offsetting remaining unavoidable wetland impacts through all appropriate and practicable compensatory mitigation actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands); and
    - c. Sufficient information is available to make a reasonable determination with respect to these demonstrations.
  - 4. The parcel shall not be considered if groundwater monitoring cannot be conducted in accordance with 9VAC 20-80-250 D unless this requirement is suspended by the Director pursuant to 9VAC20-80-250 D 1 c.
  - 5. The following site characteristics may also prevent approval, require substantial limitations on the parcel, require incorporation of sound engineering controls, or require prior DEQ compliance/enforcement approval:
    - i. The presence of gas, water, sewage, or electrical or other transmission lines under the site; or
    - ii. The existence of solid waste that has been placed over the existing FPB or on solid waste placed on land adjacent to the permitted facility not legally owned by the permittee; prior existence of an open dump; a lagoon; or similar facility, even if such facility or waste unit is closed, will be considered a defect in the proposed area for FPB modification. The proposed area for the FPB modification must be isolated from the defect by facility construction; and, the groundwater and gas migration for the existing facility must be effectively and discretely monitored and not influenced by the defect.
- C. The Hydrogeologic and Geotechnical Report[9 VAC 20-80-510]  
The hydrogeologic and geotechnical report must be submitted by a geologist or engineer registered for practice in the Commonwealth. If the site before the addition of the parcel met the boring requirements, then the Department would only require additional borings in sufficient number and location to characterize the geology, hydrogeology, and pertinent engineering properties of the added parcel in accordance with this guidance policy. However, if the subsurface conditions at the landfill site

**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 7

are relatively uniform and have been satisfactorily addressed in the approved Part A application, then the subsurface conditions of the parcel may be inferred and additional drilling may not be required. Site-specific conditions would have to be evaluated for this determination. If there is doubt about the applicability of the existing data in the Part A, then the applicant should conduct a complete investigation in accordance with this guidance policy.

1. The site investigation for the parcel shall provide sufficient information regarding the geotechnical and hydrogeologic conditions at the site to allow a reasonable determination of the usefulness of the site to move the gas compliance boundary. Since the parcel of land will not be used for waste disposal and no structures will be founded there, geotechnical considerations for structural support and bearing capacity are not required. However, the gas will be migrating through the subsurface, thus relevant subsurface conditions must be known. For example, one must consider preferential gas migration pathways; soil properties such as soil type, gas permeability and soil density; natural gas boundaries such as clay or groundwater; potential sources of natural methane such as wetlands, and so forth. The hydrogeologic information shall be sufficient to determine the characteristics of the uppermost aquifer underlying the facility. Subsurface investigation programs conducted shall meet the minimum specifications here.
  - a. Borings shall be located to identify the uppermost aquifer under the facility, determine the ability to perform groundwater monitoring at the site, and provide data for the evaluation of the physical properties of soils and soil availability. Borings completed for the proposed facility shall be sufficient in number and depth to identify the thickness of the uppermost aquifer and the presence of any significant underlying impermeable zone. Impermeable zones shall not be fully penetrated within the anticipated fill areas, whenever possible. The number of borings shall be at a minimum in accordance with the following Table:



**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 8

TABLE - Boring Schedule

Acreage	Total Number of Borings	Number of Deep Borings Required
Less than 10	4	1
10 to 49	8	2
50 to 99	14	4
100 to 200	20	5
greater than 200	24 + 1 boring for each additional 10 acres	6 + 1 boring for each additional 40 acres

- b. The Department reserves the right to require additional borings in areas in which the number of borings required by the Table is not sufficient to describe the geologic formations and groundwater flow patterns below the proposed solid waste disposal facility.
- c. In highly uniform geological formations, the number of borings may be reduced, as approved by the Department.
- d. The borings should employ a grid pattern, wherever possible, such that there is, at a minimum, one boring in each major geomorphic feature. The borings pattern shall enable the development of detailed cross sections through the proposed landfill site.
- e. Subsurface data obtained by borings shall be collected by standard soil sampling techniques. Diamond bit coring shall be used for competent rock. The sampling interval for the boring required by the Table shall be performed on a continuous basis for the first 20 feet below the lowest elevation of the solid waste disposal facility or to the bedrock. Additional samples as determined by the registered geologist or engineer shall be collected at five-foot intervals thereafter.
- f. Excavations, test pits and geophysical methods may be employed to supplement the soil boring investigation.
- g. The determination of the rate and direction of groundwater flow across the site must be demonstrated. All groundwater monitoring points or water level measurement points shall be designed to allow proper abandonment by backfilling with an impermeable material.



**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 9

- h. Field analyses shall be performed in representative borings to determine the in situ hydraulic conductivity.
2. The geotechnical and hydrogeologic reports shall at least include the following principal sections:
  - a. Field procedures. Boring records and analyses from properly spaced borings in the facility portion of the site. Final boring logs shall be submitted for each boring, recording soils or rock conditions encountered. Each log shall include the type of drilling and sampling equipment, date the boring was started, date the boring was finished, a soil or rock description in accordance with the United Soil Classification System or the Rock Quality Designation, the method of sampling, the depth of sample collection, the water levels encountered, and the Standard Penetration Test blow counts, if applicable. Boring locations and elevations shall be surveyed with a precision of 0.01 foot. At least one surveyed point shall be indelibly marked by the surveyor on each well. All depths of soil and rock as described within the boring log shall be corrected to National Geodetic Vertical Datum, if available.
  - b. Geotechnical interpretations and report including complete engineering description of the soil units underlying the site.
    - i. Soil unit descriptions shall include estimates of soil unit thickness, continuity across the site, and genesis.
    - ii. Laboratory determination of the soil unit's physical properties shall be discussed. The engineering properties of on-site soils as they relate to gas migration shall be determined, e.g. soil classification, liquid limit, plastic limit, particle size distribution, specific gravity, relative density, natural water content, and gas permeability. Since the soils may not be fully saturated with water, and the gas concentrations vary, the soil matrix will be a three-phase system. Any evaluation of gas permeability must consider the degree of water saturation and gas concentration.
  - c. Hydrogeologic report.
    - i. The report shall include water table elevations, direction and calculated rate of groundwater flow and similar information

**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 10

on the hydrogeology of the site. All raw data shall be submitted with calculations.

- ii. The report shall contain a discussion of field test procedures and results, laboratory determinations made on undisturbed samples, recharge areas, discharge areas, adjacent or areal usage, and typical radii of influence of pumping wells.
- iii. The report shall also contain a discussion of the regional geologic setting, the site geology and a cataloging and description of the uppermost aquifer from the site investigation and from referenced literature. The geologic description shall include a discussion of the prevalence and orientation of fractures, faults, and other structural discontinuities, and presence of any other significant geologic features. The aquifer description should address homogeneity, horizontal and vertical extent, isotropy, the potential for groundwater remediation, if required, and the factors influencing the proper placement of a groundwater monitoring network.
- iv. The report shall include a geologic map of the site prepared from one of the following sources as available, in order of preference:
  - (a) Site specific mapping prepared from data collected during the site investigation;
  - (b) Published geologic mapping at a scale of 1:24,000 or larger;
  - (c) Published regional geologic mapping at a scale of 1:250,000 or larger; or
  - (d) Other published mapping.
- v. At least two generally orthogonal, detailed site specific cross sections which shall sufficiently describe the geologic formations identified by the geologic maps prepared in accordance with 9VAC20-80-480 A 2 c (4) at a scale which clearly illustrates the geologic formations shall be included in the hydrogeologic report. Cross sections shall show the

**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 11

geologic units, approximate construction of existing landfill cells, water table, and surficial features along the line of the cross section. Cross section locations shall be shown on an overall facility map.

- vi. Potentiometric surface maps for the uppermost aquifer which sufficiently define the groundwater conditions encountered below the proposed solid waste disposal facility area based upon stabilized groundwater elevations. Potentiometric surface maps shall be prepared for each set of groundwater elevation data available. The applicant shall include a discussion of the effects of site modifications, seasonal variations in precipitation, and existing and future land uses of the site on the potentiometric surface.
- vii. If a geological map or report from either the Department of Mines, Minerals, and Energy or the U.S. Geological Survey is published, it shall be included.

**V. COMPLIANCE BOUNDARY SITE INFORMATION**

**A. Site Conditions.** [§ 9 VAC 2-80-520] List and discuss the conditions of site development as stated in the Department's approval of the geotechnical report and the measures taken to meet the conditions where they apply to the gas management systems.

**B. Plans and Discussion.** Show a plan for initial site preparation and discuss the field measurements, photographs to be taken, sampling and testing procedures to be used to verify that the field conditions encountered were the same as those defined in the geotechnical report. Discuss the methods that will be used to document that the site and facilities were constructed according to the plans and specifications upon which the permit was based.

**C. Specifications.** Present the specifications for probe construction and operation. The specifications must include, as a minimum, the following information:

- ! Clearing and grubbing;
- ! All excavations;
- ! Drainage control structures;
- ! Condensate collection system;
- ! Other special features.

**D.** The gas monitoring and control program must continue throughout the active life of the facility and the closure and post-closure care periods or until the operator receives written

**MODIFICATION OF THE FACILITY PROPERTY BOUNDARY FOR GAS MONITORING AT LANDFILLS**-Division of Waste Program Coordination Guidance Document No. 99-001, Page 12

authorization to discontinue by the Department. Authorization to cease gas monitoring and control will be dependent on a demonstration by the operator that there is no potential for gas migration beyond the property boundary or into facility structures. Gas monitoring and control systems must be modified, during the closure and post-closure maintenance period, to reflect changing on-site and adjacent land uses. The Department must amend the permit for any changes in the gas monitoring. Post closure land use at the site must not interfere with the function of gas monitoring and control systems.

**VI. ADMINISTRATIVE INFORMATION**

If there are any questions concerning this guidance please contact the Office of Waste Permitting Management at (804) 698-4214 or the DEQ Regional Office-Solid Waste Compliance Manager.

**APPROVED:**

                      
[SIGNED]  
Hassan Vakili, Director  
Division of Waste Operations